भारतीय मानक
Indian Standard

IS 9234 (Part 2) : 2021

ठोस अपशिष्ट के नमूने की तैयारी और परीक्षण के लिए विधि

भाग 2 नमी का निर्धारण (औद्योगिक ठोस कचरे को छोड़कर)

(पहला पुनरीक्षण)

Methods of Sampling and Test for Solid Waste

Part 2 Determination of Moisture Content (Excluding Industrial Solid Wastes)

(First Revision)

ICS 13.030.10

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June 2021

Price Group 2

Solid Waste Management Sectional Committee, CHD 33

FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards after the draft finalized by the Solid Waste Management Sectional Committee, had been approved by the Chemical Division Council.

In the preparation of this standard, considerable assistance was derived from the publication 'Methods of sampling and analysis of solid wastes. Section for solid waste, EAWAG, CH 8600 Dubendorf (Switzerland) issued by the Swiss Federal Institute for Water Supply, Sewage Purification and Water Pollution Control.

This revision has been taken up to develop the Solid Waste test method standards as parts of IS 9234 Methods of sampling and test for solid waste to find the relevant test methods instantly. This standard being published as IS 9234 (Part 2), is the revision of IS 9235 : 1979. After publication of this standard, IS 9235 : 1979 shall be withdrawn. The other standard being published along with this standard as Part 1 is the revision of IS 9234 : 1979 [Doc: CHD 33 (10314)].

During the revision attempt has been made to incorporate changes according to the latest developments in the field. To avoid duplication, reference to Doc: CHD 33 (10314) has been given for preparation of sample. Further, efforts have been made to align the terms, such as 'solid waste' with the definitions given in solid waste rules notified by Government of India as amended from time to time.

The composition of technical committee responsible for formulation of this standard is given in Annex A.

In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'.

Indian Standard

METHODS OF SAMPLING AND TEST FOR SOLID WASTE

PART 2 DETERMINATION OF MOISTURE CONTENT (EXCLUDING INDUSTRIAL SOLID WASTES)

1 SCOPE

This standard prescribes a method for determination of moisture in solid wastes excluding industrial wastes.

2 REFERENCES

The Indian Standards listed below contain provisions which through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revisions, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards:

IS No.	*Title*
IS 9234 (Part 1) : 2021	Methods of sampling and test for solid waste: Part 1 Preparation of sample for analysis (*under print*)
9569 : 1980	Glossary of terms relating to solid wastes

3 TERMINOLOGY

For the purpose of this standard the definitions of the terms, symbols and units given in IS 9569 and the following shall apply.

3.1 Solid Waste — Solid waste means and includes solid or semi-solid domestic waste including sanitary waste, commercial waste, institutional waste, catering and market waste and other non residential wastes, street sweepings, silt removed or collected from the surface drains, horticulture waste, agriculture and dairy waste, treated bio-medical waste excluding industrial waste, bio-medical waste and e-waste, battery waste, radio-active waste generated in the area under the local authorities and other entities.

4 PREPARATION OF SAMPLE

Crude samples are not ready for examination. The three basic operations required to prepare the sample for detailed analysis are drying, grinding or pulverizing, and mixing as per the procedure prescribed in IS 9234.

5 DETERMINATION OF MOISTURE

5.1 Procedure

In order to determine the moisture content, weigh the entire sample. Spread it thinly and dry in a drying oven till its mass becomes constant. Drying may be generally done at 100-105 °C. In case of presence of combustibles, a separate set of analysis shall be carried out at 70 to 75 °C. The dried samples are somewhat hygroscopic. They shall be left to cool in a turned off drying oven and weighed immediately afterwards.

5.2 Calculation

$$c = a - b$$

$$e = d - b$$

$$w = \frac{c - e}{c} \times 100$$

$$DS = \frac{e}{c} \times 100$$

$$DS + w = 100\ (NS)$$

where

a = gross mass, wet;

b = mass of receptacle (tare);

c = net mass, wet;

d = gross mass, dried;

e = net mass, dried.

DS = dry substance of the sample, percent by mass;

w = moisture content of the sample, percent by mass; and

NS = non-dried substance of the sample.

6 RESULTS OF ANALYSIS

The moisture content of the sample is closely linked with the place and method by which it was taken and whether it was immediately mixed and filled into containers or only after some time.

6.1 To facilitate comparison of results, the data of analysis shall be normally calculated on the basis of dry substance.

6.2 When a single sample is drawn and analysed in order to obtain information about the quantity of a sample unaffected by a process or to determine its state, it shall be referred to as single analysis.

6.3 When samples are taken and analyzed at various intervals depending upon purpose and process, it shall be referred to as series analysis.

6.4 Single Analyses — These shall be calculated as given below.

6.4.1 Evaluation shall be done on the basis of dry substance (DS) in percentage by mass.

6.4.2 Evaluation shall be done on the basis of the non-dry substance (NDS) also in percentage by mass.

6.5 Series Analyses

These shall be calculated as given below.

6.5.1 Evaluation shall be done on the basis of initial dry substance (IDS) in percentage by mass.

6.5.2 The results of analysis of a series of tests carried out to follow fermentation shall be calculated on the basis of the following assumptions:

a) It may be noted from quantitative analysis point of view that, the ash content remains constant during fermentation. Whereas, the organic part decomposes and a quantitative reduction takes place.

b) All results may be converted and compared with each other with the aid of sample's ash content as well as IDS of the sample.

NOTE — When handling refuse, the analyst should use gloves, if possible of neoprene-coated canvas. He should also wear a face mask, such as a surgical mask, when preparing samples, especially when they are in finely divided form.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Solid Waste Management Sectional Committee, CHD 33

Organization	*Representative(s)*
Central Road Research Institute	Ms Anuradha Shukla (***Chairman***)
Alkali Manufacturers' Association of India	Shri K. Srinivasan Dr H. S. Das (*Alternate*)
Avantha Centre for Industrial Research, Yamunanagar	Dr Nishi Kant Bhardwaj Shri Sanjeev Gupta (*Alternate*)
Cement Manufacturers Association, New Delhi	Dr K. C. Narang Dr K.V. Reddy (*Alternate*)
Central Pollution Control Board, New Delhi	Shri J. S. Kamyotra
Central Road Research Institute, New Delhi	Shri Guruvittal Dr Neeraj Sharma (*Alternate*)
Confederation of Indian Industry, New Delhi	Mrs Seema Arora Shri Kamal Sharma (*Alternate*)
Delhi Technological University, Delhi	Dr Rakesh Mehrotra Dr (Shrimati) Anubha Mandal (*Alternate*)
Department of Civil Engineering, Indian Institute of Technology, Delhi	Dr Mukesh Khare Dr Atul Mittal (*Alternate*)
Development Alternative	Dr K. Vijaya Lakshmi Dr Soumen Maity (*Alternate*)
Engineers India Limited, New Delhi	Shri R. S. Prasad Shri Vikram Singh (*Alternate*)
Federation of Indian Chambers of Commerce and Industry, New Delhi	Ms Archana Datta Ms Suchismita Mukhopadhyay (*Alternate*)
Fly Ash Mission, Department of Science and Technology, Ministry of Science, GOI	Dr R. K. Joshi
In personal capacity	Dr N. B. Majumdar
In personal capacity	Dr Vimal Kumar
Indian Centre for Plastics in the Environment, Mumbai	Shri T. K. Bandopadhyay Shri Gopal Jha (*Alternate*)
Indian Chemical Council, Mumbai	Dr N. J. Singh Shri A. A. Panjwani (*Alternate*)
Indian Oil Corporation Ltd, Faridabad	Dr M. P. Singh
Infrastructure Leasing and Financial Services	Shri Neeraj Chandra Shri Sandeep Malhotra (*Alternate*)
ITC Limited	Shri Sanjib Bezbaroa
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Ministry of Environment, Forest and Climate Change	Miss Sanchita Jindal Shri E. Thirunavukkarasu (*Alternate*)
Ministry of New and Renewable Energy, New Delhi	Shri Vinod Kumar Jain

Organization	*Representative(s)*
Ministry of Urban Development, New Delhi	SHRI UDIT RATNA SHRI P. K. DURIA (*Alternate*)
Municipal Corporation of East Delhi, Delhi	SHRI RAVI DASS SHRI P. K. KHANDELWAL (*Alternate*)
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National Solid Waste Association of India	SHRI AMIYA KUMAR SAHU CAPT MANJU MINHAS (*Alternate*)
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Research Designs and Standards Organization, Indian Railways	AWAITED
Steel Authority of India Limited, New Delhi	DR MEENAKSHI KAKKAR SHRI SUNIL SINGAL (*Alternate*)
Steps Pvt Ltd	SHRI T. RAGHAVENDRA RAO
Sulabh International Social Service Organization	AWAITED
The Energy and Resources Institute, New Delhi	COL R. K. JOHRI (RETD) DR SUNEEL PANDEY (*Alternate*)
The Fertilizer Association of India, New Delhi	SHRI MANISH GOSWAMI SHRI B. KRISHNAPPA (*Alternate*)
Town and Country Planning Organization, M/o Urban Development and Poverty Alleviation, New Delhi	SHRI K. K. JOADDER DR SANTHOSH VIDYADHARAN (*Alternate*)
Ultratech Cement	AWAITED
BIS Directorate General	SHRI A. K. LAL SCIENTIST 'E' AND HEAD (CHD) [REPRESENTING DIRECTOR GENERAL (*Ex-officio*)]

Member Secretary

SHRISHTI DIXIT
SCIENTIST 'D' (CHD), BIS

Bureau of Indian Standards

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This Indian Standard has been developed from Doc No.: CHD 33 (10315).

Amendments Issued Since Publication

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